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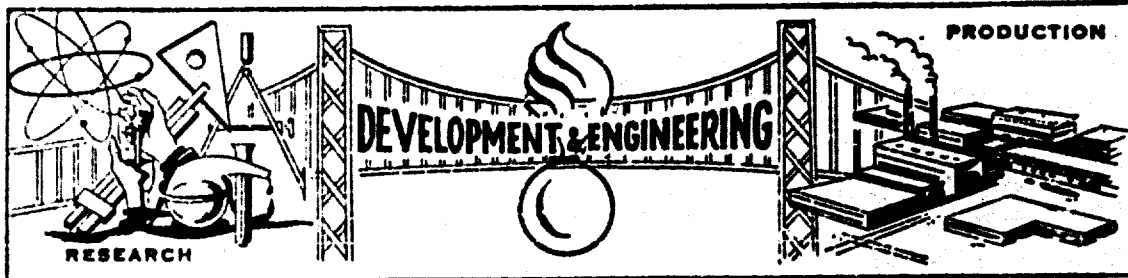
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DC-OR: 4-61

CONVENTIONAL
AND
GUIDED MISSILE AMMUNITION

MAINTENANCE ENGINEERING QUARTERLY REPORT

1 APRIL 1961 - 30 JUNE 1961

AUGUST 1961

AMMUNITION GROUP

PICATINNY ARSENAL - DOVER, NEW JERSEY

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CONVENTIONAL AND GUIDED MISSILE AMMUNITION

MAINTENANCE ENGINEERING QUARTERLY REPORT

DC-QR: 4-61

PERIOD: 1 APRIL - 31 JUNE 1961

AMMUNITION ENGINEERING BRANCH

AMMUNITION PRODUCTION AND MAINTENANCE ENGINEERING DIVISION

PICATINNY ARSENAL - DOVER, NEW JERSEY

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SECTION I - FEDERAL SUPPLY CATALOGING ACTIVITIES FOR CONVENTIONAL AMMUNITION

The Federal Supply Cataloging Activities performed during this period are summarized in Table I. The table indicates the number of functions processed to the Armed Forces Supply Support Center for approval and the number of functions for which approval was received.

TABLE I - SUMMARY OF CATALOGING ACTIVITIES

Activity	Processed to the Armed Forces Supply Support Center	Approval Received from the Armed Forces Supply Support Center
Descriptive type Federal Stock Numbers entering into the system by normal procedure	8	16
Descriptive type Federal Stock Numbers entering into the system by emergency procedure	14	18
Revision of Item Identification Number Cards for Federal Stock Numbers in the system	12	53
Reference type Federal Stock Numbers entering into the system	9	16
Transpose of Reference Item Identification Numbers to Descrip- tive Item Identification Numbers	2	2
Item Names Entering into the system	10	4
Generic Descriptions for Department of Defense Ammunition Codes	15	10
Additional Reference Cards to indicate additional references and users	52	261

Approximately thirty-five item names were approved and processed in order to obtain assignment of model designations for ammunition items.

Upon receipt of the assigned Federal Stock Numbers from the Armed Forces Supply Center, this Arsenal forwards the numbers to the applicable requesting activity. The required catalog data for approximately ninety-three item

identifications were forwarded to the Ordnance Ammunition Command. A listing containing 2,224 item identifications indicating cancellations or transfers was forwarded to the Ordnance Ammunition Command. Eight Freight Classification Cards were transmitted to the Ordnance Ammunition Command.

SECTION II - MAINTENANCE ENGINEERING - CONVENTIONAL AMMUNITION

1. Technical Liaison

a. Tooele Ordnance Depot

Tooele Ordnance Depot was visited 27-31 March 1961. At the time of visit, Tooele was encountering difficulties in meeting the minimum depth of the cavity when renovating the 90MM, M71 Cartridge. The machining operations and measurements were taken from the base edge of the shell. However, the base plate extended approximately .030" beyond the base edge. Also the shell had hard spots in the base. To overcome this, the drilling and milling operation required very high thrust on the machine and in most cases the shell was moved forward in the clamp, resulting in a shallow cavity when measured from the base edge. When measurements were taken from the base plate adjacent to the cavity, all shell met the drawing requirements.

The drawings show the cavity to be perfectly square on the bottom. Making the cavity square on the bottom resulted in high mortality on tool life. End mills and drills required changing every 45 to 70 rounds.

The applicable drawings were revised to measure the depth of the cavity from the base plate adjacent to the cavity and a taper was allowed on the bottom of the cavity. These changes increased tool life by approximately 300% and eliminated reworking of shell for shallow cavities.

b. Ordnance Ammunition Command

The Ordnance Ammunition Command was visited 12-16 May 1961. During the visit, operating personnel completed preparations of a new renovation schedule for FY62. The following is a tentative schedule for liaison visits to Field Service Installations:

13-FY62

Navajo
Red River
Sioux

22-FY62

Blue Grass
Pueblo
Savanna
Wingate

32-FY62

Sierra

42-FY62

Anniston
Letterkenny
Seneca

2. Revision of Complete Round Charts

The Artillery Ammunition Book II of this project is complete and currently is being distributed to interested activities.

Book I, Small Arms Ammunition, consisting of 7 charts is currently being printed and will be available for distribution by August 1961.

Book III, Bombs, Pyrotechnics, Grenades Mines, Rockets, Demolition Material and Miscellaneous Items, is currently being compiled and is expected to be completed by August 1961.

3. Fuze Interchangeability Chart

Boardart for this chart is currently being prepared to be included in a change to TM 9-1300-203, Ammunition for Antiaircraft, Tank, Antitank and Field Artillery Weapons. Upon completion of the boardart, prints of this chart will be distributed to the interested activities.

SECTION III - MAINTENANCE ENGINEERING - GUIDED MISSILE AMMUNITION

1. Honest John Missile System

Technical Documents and Documentation

a. Rocket Motor: XM66

(1) Drawings

Drawings, 11" x 17", in size, were prepared for Improved Honest John Rocket Motor: XM66 and forwarded to the Army Ballistic Missile Agency.

(2) Recommendation was made for a redesign of the Shipping and Storage Container for the Rocket Motor: XM66. It was observed, on a recent visit to Emerson, that containers were damaged and would not provide adequate protection to its contents when handling or while in storage.

b. Demilitarization

(1) Spin Rocket M7

Procedures for the Demilitarization of the M7 Spin Rocket has been completed. Boardart is presently being prepared depicting fixtures, barricade, etc., required to properly demilitarize the spin rockets. It is expected that these procedures will be forwarded to Army Ballistic Missile Agency during the next quarter.

(2) Demilitarization procedures have been initiated on the XM7 Rocket Motor.

2. Little John Missile System

Technical Documents and Documentation

a. Drawings

(1) Drawings, 11" x 17" in size, were prepared for the Little John Rocket Motors: XM671, Practice Warhead Section: XM8, and Shipping and Storage Container for Practice Warhead Section: XM143. These drawings were forwarded to Army Ballistic Missile Agency during the last quarter. Revised drawings for the aforementioned items are presently being prepared for delivery to Army Ballistic Missile Agency.

(2) Review of Documentation

(a) Technical Manual 9-1340-204-15 is presently being reviewed for technical accuracy and adequacy. Comments will be forwarded to Army Ballistic Missile Agency, upon completion, during the next quarter.

(b) Monthly Progress Reports, submitted to this Arsenal by Intercontinental Manufacturing Company, Inc., reviewed. Proposed design changes to the Rocket Motor: XM26E1 were analyzed for ease of maintenance operations.

(3) Maintenance Standards and Procedures

A draft of Inspection and Repair Criteria for Practice Warhead Section: XM8 was completed and is presently being processed. Boardart has been initiated to depict maintenance procedures. It is expected that delivery of the finalized draft will be made to Army Ballistic Missile Agency during the next quarter.

(4) Design and fabrication of a Bearing Extractor for the Little-John Rocket Motor: XM26E1 were accomplished during this past quarter. Drawings on this tool are being forwarded to Army Ballistic Missile Agency.

3. Hawk Missile System

Material and Maintenance Improvement

a. Warheads XM5E3, XM5E4, XM5E2, XM10E2 and Safety and Arming Device: XM32E4 and XM32E6.

(1) Service life data for the Hawk warheads and the Safety and Arming (SAA) device were forwarded to the Army Rocket and Guided Missile Agency (AROMA).

(2) Testing of Safety and Arming Device Test Fixture with an XM32E6 SAA was conducted. The test revealed that the fixture would require modification so that it would be adequate for the XM32E6 SAA. Observers from the Raytheon Company indicated that changes would be made in the design.

(3) Interim report concerning the testing of SAA Device Serial Number 1204 involved in the malfunction of Missile G111 forwarded to AROMA. A technical report on the malfunction investigation, complete with illustrations and other pertinent data, will be forwarded during the next reporting period.

(4) Demilitarization procedures for the warheads and SAA were forwarded to AROMA.

(5) Results of checking the warhead mounting inserts were forwarded to AROMA. Although no indication of failure was observed in the test which used the S&D samples, further investigation at Red River Arsenal and the manufacturer revealed that a problem does exist and that modifications will be required in future production of warheads.

c. Rocket Motor XM22E8

(1) Inspection and maintenance procedures were prepared. Procedures are expected to be completed during the next reporting period.

(2) Demilitarization procedures for the following explosive items were forwarded to ARGMA:

- (a) Rocket Motor Igniter
- (b) Rocket Motor Initiator
- (c) Electrical Power Unit Fuels
- (d) Electrical Power Unit Igniter
- (e) Hydraulic Accumulator Electric Squib

4. LaCrosse Missile System

Post Development Maintenance Evaluation

a. Shipping Storage Container XM471 for Warhead T34E2

(1) Inspection criteria for surface dents in the Fuze, Noze Switch T1405E1 forwarded to ARGMA.

(2) Preparation of Department of the Army Modification Work Order for modification of missile body section container (Stacking Pads) was initiated during this reporting period. A fixture sketch has been forwarded to ARGMA for fabrication and is expected to be tested during the next reporting period. Picatinny Arsenal representative will witness this test and help ARGMA representatives formulate the final draft of a Department of the Army Modification Work Order.

5. Chillelach

Design Participation and Analysis

Preliminary drawings and sketches of the present R&D igniter, the perforated tube type, for the gas generator and the motor have been reviewed. Basically, the design consists of a common base plate, with an igniter tube extending forward into the gas generator and another igniter tube extending aft into the motor. Provision has also been made for the necessary electrical ignition equipment. Minor modifications are being made to the base plate to improve the method of mounting the igniter tubes. It is expected that R&D drawings will be available for distribution after testing of the above design has been completed.

It is also expected that approved drawings of the Armament Section XM131 will become available during the next reporting period.

Igniter and Gas Generator

Preliminary drawings of the present R&D igniter, gas generator and rocket motor assembly have been reviewed and have been forwarded to AASA for reference only.

SECTION IV - TECHNICAL PUBLICATIONS

Note. For a summary of technical publications activities, see Table I on pages 14 through 16.

1. Surveillance Manual, General (TM 9-1300-210)

The initial draft has been revised and the manuscript up-dated to reflect duties assigned Armament Inspectors at CONUS Headquarters, CONUS, Class 1 Installations, CONUS, Army Terminal Command, Oversea Command Headquarters, Oversea Depot, ASP's and SASP's. Military Assistance Advisory Group, United States Air Force Headquarters and other technical Services. Further revisions were instigated to comply with Ordnance Supply Manual 3-4, Change #26. Four tables concerning the storage life of ammunition were added to the list of illustrations to clarify the new section concerning 'Priority of Issue'.

The initial publication date has been extended to November 1961, to encompass the time involved in incorporating the additions and general text up-dating. Currently the report is being prepared for external review.

2. Cartridge, HEP-T, 105-MM, M193 and M193A1 (M193B1) (TM 9-)

During the previous quarter, it was intended to cover this HEP-T Cartridge and the other cartridges being developed for the M68 Gun in one document as a change to TM 9-1300-203. Since the subject cartridge is currently being produced in quantity, it is considered advisable to cover the cartridge through the utilization of a technical bulletin.

3. Cartridge, HEAT, 105-MM, T19432 (TM 9-)

As indicated above, it had been intended to cover the APDS-T, HEP-T and HEAT cartridges in a change to TM 9-1300-203. However, since production of the subject cartridge has not been initiated to date and a design finalized, a technical bulletin will be prepared to be made available in January 1962.

4. Cartridge, APDS-T, 105-MM, M192 and M192A1 (TM 9-)

Although a technical bulletin covering the APDS-T Cartridge has been prepared and printed, it was intended to include this cartridge together with the other cartridges authorized for use in the 105-mm Gun M68 in one document. Since the HEAT cartridge will not be produced in quantity until a later date, the technical bulletin for the subject cartridge is considered to be completely satisfactory.

5. Cartridge, HEAT, 76-MM, T180E25 (TS 9-)

The technical bulletin under preparation for this cartridge has been delayed since a design of this cartridge has not been finalized to date. It is anticipated that a design will be sufficiently finalized to permit preparation of the technical bulletin by October 1961.

6. Cartridge, HEAT, 90-MM, M371 (TS 9-)

A technical bulletin covering this cartridge is under preparation. During this quarter a request was received from Ordnance Weapons Command for ammunition coverage for the 90-mm rifle M67 in a user type manual. This coverage was forwarded to Ordnance Weapons Command. Since it was considered advisable to provide information for the weapons manual, the training literature type technical bulletin was delayed. It is intended to forward the bulletin to Raritan Arsenal for printing during the forthcoming period.

7. 105-Millimeter Full Tracked Combat Tank M60T1 (Notes on Development)

A request was received from Ordnance Tank-Automotive Command for Ammunition and Destruction of Materiel to Prevent Enemy Use portions for subject vehicle for use in a maintenance package publication. Investigation at this Arsenal disclosed that the M60T1 Tank is similar to the M60 Tank except for hull and turret differences. Ordnance Tank-Automotive Command confirmed that this was the case. Therefore, Ordnance Tank-Automotive Command was informed that the Ammunition and Destruction of Materiel to Prevent Enemy Use coverage supplied by this Arsenal for the M60 Tank is satisfactory for the "Notes on Development" type document being prepared by Ordnance Tank-Automotive Command.

8. 2.5-Inch Rocket Launchers M2CA1 and M2CA1B1 (TM 9-1051-201-12)

A request was received from Ordnance Weapons Command wherein the Ammunition and Destruction of Materiel to Prevent Enemy Use portions for the subject manual were required. Subsequently, information was received by teletype that the requirement was not necessary and the request was cancelled.

9. Demolition Materials (TM 9-1371-200) (TM 9-10-1)

Inasmuch as six changes have been published to TM 9-1046 and the manual has not been revised since November 1955, a revision was considered advisable to include demolition materials which have since gone into the supply system.

Work was initiated 1 April 1961 under a contract. The narrative portion of Chapter 1 has been submitted for evaluation.

10. Land Mines (TM 9-1345-200 (TM 9-1940))

Inasmuch as several changes have been published to TM 9-1940 and the manual has not been revised since May 1956, a revision was considered advisable to include land mines which have since gone into the supply system.

Work was initiated 24 April 1961 under a contract. The narrative portion of chapter 1 has been submitted for evaluation.

11. Trip Flare M49A1 (TM 9-1370-200/1)

A technical bulletin was prepared in order to describe the surface trip flare M49A1 and to provide information on its characteristics and use. This bulletin was forwarded to Raritan Arsenal for printing during the previous quarter, but was returned to this Arsenal for preparation as a change to the pyrotechnics manual (TM 9-1370-200). After discussion with a representative from Raritan, the document was resubmitted for printing as a bulletin.

12. Assembly of Explosive Components in Gas Projectiles (TM 9-1300-240-50)

A revision of the technical bulletin prescribing the assembly of explosive components in gas projectiles is under preparation. This revision will incorporate revised procedures for assembly of the explosive components which will minimize the possibility of loose adapters or burster charges in the projectiles.

13. Howitzers, Self Propelled, T195E1 and T196E1 (TM 9-2350-217-1C and -2D)

In accordance with a request from Ordnance Tank-Automotive Command, the Ammunition and Destruction of Materiel to Prevent Enemy Use portions for the subject manuals are being prepared. The ammunition portion will describe the ammunition authorized for use in these howitzers. Also care, handling, and preservation information pertaining to the ammunition will be supplied to the operating personnel. The Destruction of Materiel to Prevent Enemy Use portion will prescribe methods to be employed by personnel in order to prevent possible use of captured material.

14. Recoilless Rifle, 120-Millimeter, M69 (TM 9-1015-221-12)

In accordance with a request from Ordnance Weapons Command, the Ammunition and Destruction of Materiel to Prevent Enemy Use portions for the subject preliminary manual were reviewed by this Arsenal. Comments on these portions were forwarded to Ordnance Weapons Command. This Arsenal requested that Ordnance Weapons Command inform this Arsenal when the subject manual is to be finalized in order that illustrations of the latest ammunition design can be prepared for the printed publication.

15. 3.5-Inch Rockets M28A2 and M29A2 (TM 9-1950, Changes No. 4)

An inquiry was received from Ordnance Ammunition Command pertaining to the low firing temperature limit of 3.5 inch rockets M28A2 and M29A2. Investigation by this Arsenal proved that the low firing temperature limit of the aforementioned rockets is -20°F. Therefore, the subject changes were prepared to TM 9-1950 reflecting the -20°F temperature limit. These changes also affected illustrations which were modified to show the -20°F temperature limit.

16. Rocket Boosted High Explosive Cartridge XM54 (TB 9-)

A technical bulletin is under preparation to describe and provide information relative to the characteristics, use, preparation for use, precautions in use, etc. for this cartridge. This cartridge will be utilized in the XM70 Moritzer System. The bulletin will be made available at the time of user tests for assistance in conducting the tests and for an evaluation of the technical bulletin.

17. Blasting Cap, Test Set, XM51 (TB 9-)

A technical bulletin is presently being prepared in order to describe the Blasting Cap, Test Set, XM51 and to provide information on its characteristics and use. This test set is a pyrotechnic device designed to replace the galvanometer as a blasting cap circuit tester. The manuscript will be completed and forwarded for user tests, during July 1961. This bulletin will be utilized to assist in conducting the tests and for an evaluation of the bulletin.

18. Cartridge, 105-MM, HE, M442E1 (T289) (TB 9-)

A technical bulletin is currently under preparation for Cartridge, 105-MM, HE, M442E1. This bulletin will describe the cartridge and provide information relative to the functioning characteristics and use of the cartridge. This cartridge is fired from Moritzers, M2A2B2 and T252, and has been designed to provide improved range capabilities and increased lethality. This manuscript will be completed and forwarded to Raritan Arsenal for printing during August 1961.

19. Signals, XM44 Series (TB 9-)

Preparation of a technical bulletin has been initiated which will cover the Signals, XM44 Series. The technical bulletin will provide information on the characteristics and use of the signals. These items are spin stabilized hand held signals that have been developed to replace the fin stabilized hand Signals, M125 Series. This bulletin will be forwarded for user tests during September 1961.

20. Mine, APERS, XM22 (TF 9-)

A technical bulletin is being prepared to describe and provide information relative to the functioning characteristics, use, preparation for use, precautions in use, storage requirements, etc. for Mine, APERS, XM22. This item was developed to provide a small, light weight, non-metallic self-arming mine. The manuscript will be forwarded for user tests during September 1961.

21. Projectile, 155-MM, HE, T387 (TF 9-)

A technical bulletin is currently under preparation for Projectile, 155-MM, HE, T387. This bulletin will describe the projectile, its functioning characteristics, use, preparation for use, etc. A description covering the use and characteristics of the XM57 Propelling Charge will also be provided in this bulletin. This projectile and charge were designed to be utilized in Howitzers, T255 and T258. The bulletin will be forwarded for user tests during October 1961.

22. Fuze, MT, T252 (TF 9-)

A technical bulletin will be prepared in order to describe the Fuze, MT, T252 and to provide information on its characteristics and use. The fuze was developed in order to provide a fuze for mortars which has a luminous graduated scale, to permit setting without the use of a light which might attract the attention of the enemy. The fuze is similar to Fuze T240. The bulletin will be completed and forwarded to Raritan Arsenal for printing during October 1961.

23. Fuze, MT, T275E1 (TF 9-)

A technical bulletin will be initiated this quarter covering the Fuze, T275E1. This bulletin will describe the fuze, its functional characteristics and use. The fuze uses a Lucky element combined with an electric detonator. The bulletin will be completed and forwarded to Raritan Arsenal for printing during October 1961.

TABLE 1. SUMMARY AND STATUS OF TECHNICAL PUBLICATIONS

Item Number	Material and Publication Number	Purpose for Initiations of Publications			Initiated this Quarter	Under Preparation	Estimated Completion Date	Completed this Quarter	Remarks
		Draft for User Test	New Items Entering System	To bring existing documents up to date					
1	Demolition Kit, Projected Charge, T72E2 and Demolition Fit, Projected Charge, Practice, T68 (TM 9-1375-XXX-10)		X			X	5/62	X	Forwarded to Raritan Arsenal for printing during May 1961
2	Land Mines (TM 9-1940, Changes No. 4)		X						
3	Ordnance Surveillance Manual-General (TM 9-1300-210)					X	10/61		New Manual for Furnishing Surveillance Information. *See Narrative Report
4	Cartridge, HEAT, 7.105-IN, M993 and M993A1 (M993E1) (TF 9-)		X			X	7/61		*See Narrative Report
5	Cartridge, HEAT, 105-MM, T384E2 (TF 9-)		X			X	1/62		*See Narrative Report
6	Cartridge, APDS-I, 105-MM, M992 and M992A1 (TB 9-)		X			X	10/61		*See Narrative Report
7	Cartridge, HEAT, 76-MM, T180E25 (TB 9-)		X			X			*See Narrative Report
8	Cartridge, HEAT, 90-MM, M971 (TB 9-)		X			X	7/61		*See Narrative Report
9	Cal .50 Machine Gun M85C, Flexible (TM 9-1005-231-12)							X	Ammunition and Destruction Portions forwarded to CMC for printing during June 1961.
10	Truck, Cargo, M437E1: Truck, Tank, M438E1: and Truck, Cargo, M4320E1		X					X	Destruction Portion forwarded to OTAC for printing during April 1961.

TABLE I. SUMMARY AND STATUS OF TECHNICAL PUBLICATIONS (Cont'd)

Item Number	Material and Publication Number	Purpose for Initiation of Publications			Under Preparation Initiated this Quarter	Completed this Quarter	Estimated Completion Date	Remarks
		To bring existing documents up to date	New Items Entering System	Draft for User Test				
11	105-M Full-Tracked Combat Tank M50K							*See Narrative Report
12	3.5-Inch Rocket Launcher M241 and M241B1 (TM 9-1055-201-12)		X			X		*See Narrative Report Forwarded to Raritan Arsenal for printing during April 1961
13	Cartridge, 51-MM, M362A1 (TM 9-1300-205, Changes No. 1)		X			X		Forwarded to Raritan Arsenal for printing during June 1961
14	Military Pyrotechnics (TM 9-1370-200, Change No. 2)							
15	Demolition Materials (TM 9-1375-200) (TM 9-1946)	X			X		6/62	*See Narrative Report
16	Land Mines (TM 9-1345-200) (TM 9-1940)	X			X		6/62	*See Narrative Report
17	Trip Flare, M99A1 (TM 9-1370-200/1)		X			X		Forwarded to Raritan Arsenal for printing during April 1961. *See Narrative Report
18	Semitrailer Van: Electronic Shop, M555, M556, M557 and M558 (TM 9-2330-257-14)		X		X			Destruction Portion forwarded to OTAC for printing during May 1961
19	Semitrailer: Van, Explosible, 6-Ton, M313 (TS 9-2330-238-14/A)		X		X			Destruction Portion forwarded to OTAC for printing during June 1961
20	Assembly of Explosive Components in Gas Projectiles (TM 9-1300-200-50)	X			X		7/61	*See Narrative Report

TABLE I. SUMMARY AND STATUS OF TECHNICAL PUBLICATIONS (Cont'd)

Item Number	Material and Publication Number	Purpose for Initiation of Publications			Initiated this Quarter	Under Preparation	Estimated Completion Date	Completed this Quarter	Remarks
		Draft for User Test	New Items Entering System	To bring existing documents up to date					
21	Mortars, Self-Propelled, T193E1 and T1963E1 (TM 9-2350-217-1C and -20)			X	X		8/61		Ammunition and Destruction Portions. *See Narrative Report
22	Recoilless Rifle, 120-MM, M899 (TM 9-1015-231-12)		X		X			X	*See Narrative Report
23	3.5-Inch Rockets, M28A2 and M29A2 (TM 9-195C, Changes Eo. 4)			X	X			X	Forwarded to Baritan Arsenal for printing during June 1961. *See Narrative Report
24	Cartridge, 90mm, WP, M13C (TM 9-1300-201, Changes No. 2)		X		X		7/61		
25	Robot Boosted, H3 Cartridge, M54 (TB 9-)	X				X	8/61		*See Narrative Report
26	Blasting Cap. Test Set, M51 (TP 9-)	X			X		7/61		*See Narrative Report
27	Cartridge, 105-MM, HE, M442E1 (T3EE) (TP 9-)		X		X		8/61		*See Narrative Report
28	Signals, M214 Series (TB 9-)	X			X		9/61		*See Narrative Report
29	Mine, APERS, M22 (TB 9-)	X			X		9/61		*See Narrative Report
30	Projectile, 155-MM, HE, M387 (TB 9-)	X			X		10/61		*See Narrative Report
31	Fuze, MT, T252 (TB 9-)		X		X		10/61		*See Narrative Report
32	Fuze, MT, T275E1 (TB 9-)		X		X		10/61		*See Narrative Report

SECTION V - MALFUNCTION INVESTIGATIONS

1. General

Malfunction Investigations are reported as to status and separated according to class, definitions of which are shown below.

2. Classes of Malfunctions

a. Critical A (CA). Hazardous, resulting in direct probable death or serious injury (e.g., premature at or in immediate vicinity of firing weapon), or of a nature that troops are deprived of ammunition or restricted in its use (e.g., restriction of the ammunition to use above $\neq 32^{\circ}\text{F}$).

b. Critical B (CB). Hazardous, resulting in indirect probable death or serious injury (e.g., premature down range).

c. Non-Critical A (NCA). Serious tactical malfunction (e.g., failure of the ammunition item to function or material reduction in the effectiveness of the ammunition item).

d. Non-Critical B (NCB). Non-serious tactical malfunction (e.g., slight impairment in effectiveness of the ammunition item).

3. Malfunction Investigations Workload

The malfunction investigation workload is summarized in the following tables:

a. Table I indicates the number of investigations, by class, in-process at beginning of the quarter, received during the quarter, completed during the quarter, and in-process at end of quarter. The classifications are in accordance with the definitions in paragraph 2.

b. Table II indicates the number of malfunction investigation files using same breakdown as Table I.

c. Table III indicates the status of investigations in-process at end of quarter. Investigations are listed as active, active-awaiting additional samples, or inactive-awaiting samples from Ordnance Ammunition Command.

d. Table IV is a compilation of malfunctions completed during 4th quarter.

e. Table V is a detailed listing of the status of each malfunction in-process at end of FY61.

TABLE I - SUMMARY OF MALFUNCTION INVESTIGATIONS
(1 April - 30 June 1961)

Classification	In-Process at Beginning of Period	Received During Period	Completed During Period	In-Process at End of Period
CA	16	5	5	16
CB	6	5	2	9
NCA	19	9	6	22
NCB	6	0	2	4
Total	47	19	15	51

TABLE II - SUMMARY OF MALFUNCTION INVESTIGATION FILES
(1 April - 30 June 1961)

Classification	In-Process at Beginning of Period	Received During Period	Completed During Period	In-Process at End of Period
CA	36	16	20	32
CB	19	5	3	21
NCA	37	15	8	44
NCB	9	0	4	5
Total	101	36	35	102

A comparison of Malfunction Investigation Files (Table II) and Malfunction Investigations (Table I) indicates that although there are 102 individual MIFs "In Process at End of Period", all are represented by 51 investigations. This represents an increase in the backlog of one MIF and four Engineering Investigations for the period.

TABLE III - STATUS OF CURRENT INVESTIGATIONS
(June 30, 1961)

Classification	Active	Inactive - Awaiting Samples from OAC	Active - Awaiting Additional Samples	Total
CA	8	6	2	16
CB	5	4	0	9
NCA	12	7	3	22
NCB	4	0	0	4
Total	29	17	5	51

4. Significant investigations completed during quarter

a. Firing Device, Pull Release Type, M3

During the quarter, malfunction investigations of 3 prematures were completed. During surveillance function tests, in each case, the device fired immediately upon removal of the positive safety pin.

Sample devices were x-rayed, examined visually, given a simulated functioning test, and checked dimensionally.

It was determined that the malfunctions were caused by dimensional deficiencies. These deficiencies were overcome by important dimensional changes made in September 1954, to improve function and safety, but the lots in which the malfunctions occurred were manufactured before that date and were not modified.

It was found that the defects discovered in this investigation would be detected by application of the preparation-for-use test of the using services.

To prevent recurrence of malfunctions of this type:

(1) Coordination is being effected with Aberdeen Proving Ground to change the standard surveillance procedure to clarify it and to include the above preparation-for-use test.

(2) It is recommended that lots manufactured before the application of the important dimensional changes of September 1954 and lots of unknown date of manufacture be given the preparation-for-use test, that all devices that fail the test be called out and destroyed, and that the remaining devices that have been suspended be released.

1. Fuse, PD, M51A5 Prematures

Twelve (12) malfunctions involving prematures of the Fuse PD M51A5 were completed during this quarter. The work of the investigation has progressed to a point wherein it was established that the most logical method of assuring that these fuses were safe in the field would be to use the M125A1. This will assure that no prematures could possibly occur within a minimum distance of 220 feet from the muzzle of the weapon. Thus, the evaluation of the data clearly shows that all injuries which have occurred because of prematures of M51A5 Fuses would not have occurred had these fuses been rostered with the M125A1 Booster. The premature rate, which is estimated as 1 per 100,000, will thus be reduced to not more than 1 per 100,000,000.

In order to check out any other fix to repair current causes of the prematures, a final test sample of at least 300,000 fuzes would be required. Hence, it is far more logical to use the M125A1 Booster. However, the current work to determine all possible causes of prematures with this fuze is still continuing as a deficiency investigation.

c. Simulator, Hand Grenade, M16, MIF A-23-60

Lot which prematured in the field, was evaluated in accordance with criteria previously forwarded to the Ordnance Ammunition Command. In addition to meeting the jolt and jumble tests criteria, this lot functioned without any low delay times after the items had been jolted and jumbled. On this basis this lot was released for use.

d. Cutter, Reefing Line, MIF A-138-60

Lot OSI-2-25, MIF A-138-60, was subjected to standard function tests. After being conditioned at various temperatures, the number of failures was found to be excessive. It was therefore, recommended that this lot be disposed of as unserviceable.

e. Simulator, Hand Grenade, M16, MIF A-62-61

Lot BPO-1-29 which prematured in the field was subjected to the standard tests for safety for this item previously recommended to Ordnance Ammunition Command. In the jolt and jumble tests these items were found to leak and function. Hence, the lot was disposed of as unserviceable.

f. Cutter, Reefing Line, M2A1, MIF A-89-60

Lot OSI-1-1, which was reported to have had excessive misfires in functioning test, was subjected to a large number of functioning tests. The results of the test revealed that this lot was satisfactory for use and that no failures occurred out of 150 samples tested in accordance with the specification requirements. It was therefore recommended that the lot be authorized for use.

5. Significant investigations active at end of quarter

a. Signal, Illum, Ground, Star Cluster, M52A1, Lots CCG-11-13, 23, 24, 27 and 29 (MIF A-76-60) and Signal, Ground, Smoke, Red, M52, Lot CCG-1-24 (MIF A-111-60)

A report was received from a users installation that one item from either Lot CCG-11-13, 23, 24, 27 or 29 had functioned ten feet from the launcher. A second report from a Field Service Depot indicated that one item from Lot CCG-1-24 functioned on the launcher.

An investigation was conducted at this Arsenal to determine the cause of this type of critical defect. During the investigation the following tests were conducted:

- (1) 800 samples were x-rayed - no defects observed.
- (2) 150 samples were disassembled - all samples were in good condition and no defects were observed.
- (3) 100 samples were air tested for leaks - 50% of the samples showed a slight leak where the stabilizer assembly is connected to the fuze housing.
- (4) 600 samples, in the condition received, were function tested. All samples, except one, functioned at an altitude of 600 feet or more. The fin from one sample of Lot CCG-11-29 became disconnected from the stabilizer assembly. The sample functioned at 200 feet, and all the stars were burned out before they hit the ground.
- (5) Three samples, with the propellant removed, were function tested. All samples functioned at an altitude of 400 feet or more.
- (6) Fifteen samples with the fuze seal ring removed were function tested. The delay time was reduced to approximately one second but the samples did not function until they had reached 300 feet or more. All the pellets or stars were burned out before they hit the ground.
- (7) Fifteen samples with the time train removed were function tested. The delay time was reduced to almost zero but the samples did not function until they had reached 200 feet or more. All the pellets or stars were burned out before they hit the ground.
- (8) Fifteen samples with six 3/16" diameter holes drilled in the stabilizer tube were function tested. The delay times were normal but the samples functioned at approximately 300 feet. All the pellets or stars were burned out before they hit the ground.
- (9) Five samples with the fuze housing weakened by more than 50% were function tested - all samples functioned normally. The fuze housings did not fail.
- (10) Ten cal. 30 cartridges were immersed in water for 2 1/2 hours and ten cartridges were immersed in water for 17 hours, and were functioned tested. All signals that were fired with the cartridges functioned at an altitude of 600 feet or more.

(11) Five samples with their stabilizer assemblies split along their full length were function tested. The gas pressure disconnected the stabilizer assembly from the fuze housing. The parts reached an altitude of 10 to 20 feet. None of the samples ejected stars. The propellant charge in none of the samples was burned.

(12) Five samples with a 1/16" wide cut along the stabilizer tube from below the threaded connection to the fins were function tested. All samples reached an altitude of less than 50 feet. Three samples did not eject stars. One sample ejected its stars just above the ground, with most of the burning taking place on the ground. The fifth sample ejected the stars after it hit the ground.

(13) Five cal. 30 cartridges with 25% of full charge (0.675 grams) were function tested. All signals that were fired with the cartridges were propelled no more than two feet above the launcher and fell to the ground. The propellant in two of the signals had burned, but did not ignite the time train. None of the samples ejected stars.

(14) Five cal. 30 cartridges with 50% of full charge (1.350 grams) were function tested. One signal functioned at an altitude of 150 feet, and the stars had completed burning before they reached the ground. Three signals just reached an altitude of 50 feet. Two of these signals did not eject stars (but the propellant in the signals had burned), one of these signals ejected its stars after the assembly had hit the ground. The fifth signal reached an altitude of 30 to 40 feet. The propellant in the signal had burned but the stars were not ejected.

(15) Five cal. 30 cartridges, with 75% of full charge (2.025 grams), were function tested. All signals reached an altitude of 500 feet or more. One signal did not eject stars.

As a result of the tests described above, the following conclusions can be made:

(1) Subject lots are in good condition and have not been affected by moisture.

(2) The type of defect that was reported cannot be attributed to the propellant in the signal, a defective fuse, a minute crack in the stabilizer assembly, or cal. 30 cartridges that have been exposed to moisture.

(3) Subject items can function at less than 50 feet if the stabilizer assembly has a visually perceptible crack or if a cal. 30 cartridge with less than 2 grams propellant is used.

(4) The defect described in the field service report was caused by using a cal. 30 cartridge with sufficient propellant to ignite the time train, but not enough to propel the item a perceptible distance (less than 1.35 grams).

(5) The defect that was reported by the user was probably caused by a defective .30 caliber cartridge although it can conceivably be caused by a badly split stabilizer.

Since such defective cartridges can result in critical defects in many different items, the determination of corrective action is being coordinated with Frankford Arsenal who have the small arms mission.

b. MTSQ Fuze M500 Series Duds

(1) Results of tests conducted during the previous quarters were evaluated during this quarter.

(2) Based on the results which indicated that in several lots the dud problem was traceable to the M7 Relay, a preliminary test was conducted with relays from an acceptable lot of fuzes. This test indicated that new M7 Relays could improve performance of the fuze lots.

(3) Loading of new M7 Relays and assembly into fuze lots to be final tested for improved performance were accomplished.

(4) During the next quarter it is anticipated that the final testing will be accomplished and recommendations will be forwarded to Ordnance Ammunition Command.

c. 105MM HE Cartridge, M1, w/Fuze, VT, T226E2 Premature (MIF A-64-59)

(1) During the quarter the test firing program phase of the malfunction investigation to determine the cause of an in-bore premature with the 105MM HE Cartridge, M1 assembled with VT Fuze T226E2/A was completed.

(2) The test firings included the following:

(a) Cartridges containing excessive cavitation in the explosive filler of the shell.

(b) Cartridges assembled with fuses not seated in nose of shell (various size gaps between fuze and nose of shell).

(c) Cartridges assembled with fuses containing weakened sleeves.

(3) No malfunctions were observed during the firings. APG is currently analyzing the photographs taken of the shell flights.

(4) Based on the results of the test firings and previously conducted inspections and tests of ammunition components, an evaluation is currently being made as to appropriate recommendations for the disposition of the cartridge and fuze lots.

6. Visitations to Malfunction Sites

a. General. During this quarter, four site visitations were made to investigate malfunctions involving ammunition.

b. M51A5 Fuze Prematures

(1) Two sites, Fort Sill and Fort Dix, were visited to investigate prematures which occurred with 105MM HE Cartridges assembled with PD Fuzes M51A5. In both instances, the prematures occurred close-in (24 feet and 20 feet) and resulted in casualties. No defects were noted in the ammunition that was visually inspected at the sites and no procedural discrepancies were found.

(2) Based on the premature distances and the muzzle velocities involved, it was considered that there was a substantial probability that in each case the delay plunger had been initiated within the weapon.

(3) Samples of fuzes from lots involved have been requested from Ordnance Ammunition Command and will be included in current study being conducted with respect to the basic fuze.

c. 155-M Inert-Loaded Shell M107

(1) The Erie Ordnance Depot, Fort Clinton, Ohio, was visited to investigate a premature which occurred with a 155MM Inert-Loaded Shell M107. The premature occurred within the weapon and resulted in considerable damage to the Self-Propelled Howitzer.

(2) Based on information developed during the visitation, it was concluded that the malfunction incident was not attributable to the ammunition and was most likely due to a breech mechanism failure.

(3) No action was taken to suspend any of the ammunition items.

d. M500 Fuze Premature

(1) Camp Drum, Watertown, New York, was visited to investigate a premature which occurred with an 8-Inch HE Projectile M106 assembled with

MISQ Fuze M500. The premature occurred at 60 yards and resulted in injury to one soldier.

(2) No defects were noted in the ammunition that was inspected at the site and there was no evidence that any firing safety procedures had been violated. Questioning of personnel established that the fuze assembled in the malfunctioning round was an M500, since the fuze setter remembered that the fuze did not have an arrow stamped on the lower cap (the arrow appears only on A1 Fuzes).

(3) Based on findings, it was concluded that the premature was of the same type as had been experienced with the M500 Fuze in the past.

e. 81-MM HE Cartridge M43A1 Short Round

(1) During the Camp Drum visitation, (d above), a short round which occurred, with an 81-MM HE Cartridge, M43A1 was also investigated. The short round was originally reported as a premature.

(2) The short round was estimated at 80 to 100 yards. Examination of rounds returned from the malfunction site revealed some moisture which was probably the result of rain experienced during the firings. Inspection of the weapon involved had previously revealed increments at the mouth.

(3) Based on the information in (2) above and since all previously fired rounds (494 rounds) had reached the target area, it was concluded that the short round was the result of wet ammunition components caused by water in the mortar tube.

(4) It was recommended to Ordnance Ammunition Command that the ammunition involved be released for issue and use.

CONCLUSIONS

	*X/R - Not Reported
10-11-68	10-11-68
10-12-68	10-12-68
10-13-68	10-13-68
10-14-68	10-14-68
10-15-68	10-15-68
10-16-68	10-16-68
10-17-68	10-17-68
10-18-68	10-18-68
10-19-68	10-19-68
10-20-68	10-20-68
10-21-68	10-21-68
10-22-68	10-22-68
10-23-68	10-23-68
10-24-68	10-24-68
10-25-68	10-25-68
10-26-68	10-26-68
10-27-68	10-27-68
10-28-68	10-28-68
10-29-68	10-29-68
10-30-68	10-30-68
10-31-68	10-31-68
11-1-68	11-1-68
11-2-68	11-2-68
11-3-68	11-3-68
11-4-68	11-4-68
11-5-68	11-5-68
11-6-68	11-6-68
11-7-68	11-7-68
11-8-68	11-8-68
11-9-68	11-9-68
11-10-68	11-10-68
11-11-68	11-11-68
11-12-68	11-12-68
11-13-68	11-13-68
11-14-68	11-14-68
11-15-68	11-15-68
11-16-68	11-16-68
11-17-68	11-17-68
11-18-68	11-18-68
11-19-68	11-19-68
11-20-68	11-20-68
11-21-68	11-21-68
11-22-68	11-22-68
11-23-68	11-23-68
11-24-68	11-24-68
11-25-68	11-25-68
11-26-68	11-26-68
11-27-68	11-27-68
11-28-68	11-28-68
11-29-68	11-29-68
11-30-68	11-30-68
12-1-68	12-1-68
12-2-68	12-2-68
12-3-68	12-3-68
12-4-68	12-4-68
12-5-68	12-5-68
12-6-68	12-6-68
12-7-68	12-7-68
12-8-68	12-8-68
12-9-68	12-9-68
12-10-68	12-10-68
12-11-68	12-11-68
12-12-68	12-12-68
12-13-68	12-13-68
12-14-68	12-14-68
12-15-68	12-15-68
12-16-68	12-16-68
12-17-68	12-17-68
12-18-68	12-18-68
12-19-68	12-19-68
12-20-68	12-20-68
12-21-68	12-21-68
12-22-68	12-22-68
12-23-68	12-23-68
12-24-68	12-24-68
12-25-68	12-25-68
12-26-68	12-26-68
12-27-68	12-27-68
12-28-68	12-28-68
12-29-68	12-29-68
12-30-68	12-30-68
12-31-68	12-31-68

CB CATEGORY

Item	Val function	MP Number	Lt Porter	Date of Occurrence	Date Rec'd at FA	Disposition
2-g.4.2 in: FE. M20	Short round	A 109-60	ICF 4-15A	21 Dec 60	13 Feb 61	Demilitarize
Ctg. 106mm: HEAT. M24A1	Split case	A 101-60	PA 4-7	27 Jul 60	12 Aug 60	X-ray & replace defective cases
rocket, 2.5 in: M20	Split Body	A 81-59	AWM-1-46, RD-1-142	21 Aug 59	18 Sep 59	Unserviceable demilitarize

NCA CATEGORY

Ctg. 106mm: HEAT, Excessive duds M24A1	A 177-57	PA 198-1	30 Oct 57	12-FY60	Release for training only
Ctg. 106mm: HEAT, Misfire M24	A 24-61	ICF 2-27	14 Feb 61	5 Apr 61	Occasional misfire not malfunction
Cutter, Fdr Actd: Misfire Rsg Ln. M2A1	A 89-60	OSI 1-1	12 Jul 60	10 Oct 60	Release tests satisfactory
Cutter, Fdr Actd: Excessive pull Rsg Ln. M2A1	A 138-60	OSI 2-25	Aug 60	25 Oct 60	Demil-renovation uneconomical
Fuze, FTSQ: M20A1	A 107-60	GSM-2-178	N/R*	2 Sep 60	Released-not hazardous
Signal, Ill, AC: Short round AM-2-8A2	A 42-61	APW-61-1	20 Mar 61	1 Apr 61	Lot exhausted-no disposition required
Signal, Ill, AC: Star breakup AK-M27A2	A 156-60	FCM 1-6	Apr 60	1 Dec 60	Release-no defect found
Rocket, 2.5 in: Misfire Prac. M29A2	A 72-60	KOP-1-334	Jun 60	22 Aug 60	Replace igniters if resist. over 1.75 Ohms

NCB CATEGORY

Ctg. 81mm: Illum. M20A1	A 176-60	RD-8-50	15 Nov 60	1 Feb 61	Replace cracked fins-release
Ctg. 90mm: HE. M71	A 35-39	JA-13-51X	13 Feb 59	1Q-FY60	Replace cases
"	"	"	"	"	"
Ctg. 106mm: HEAT. M24A1	A 187-60	KOP-52-211X	7 Dec 60	1 Feb 61	"
"	A 185-60	PA-198-20	15 Nov 60	13 Jan 61	X-ray & replace defective cases

TABLE 1 - STATUS OF MALFUNCTION FILES

CA CATEGORY

Item	Malfunction	MIF Number	Lot Number	Date Occurred	Date Rec'd at PA	Estimated Completion Date	Remarks
Ctg, 40MM: HRT-SD, M12	Premature	A-2-56	UBA-32-HA-53	2 Aug 56	20 Nov 59	3Q-FY62	In progress.
Ctg, 81MM: HB, M341	Premature	A-190-60	KOP-9-195-Y, Z	11 Dec 60	14 Dec 60	2Q-FY62	In progress.
Ctg, 90MM: HB, M71	Premature	4790 A-68-56	RVA-11-5 RVA-11-3	17 Aug 55 14 Feb 56	1Q-FY60 1Q-FY60	2Q-FY62	In progress.
Ctg, 105MM: HB, M1	Premature	A-64-59	KM-35-6X	21 Jun 59	2Q-FY60	2Q-FY62	In progress.
Firing Device: Demolition Release Type, M1	Premature	A-196-60	KK-600-1	N/R	3 Jan 61	3Q-FY62	In progress.
Firing Device, Demolition: Pressure Type, M1A1	Premature	A-34-61	SRD-600-3	16 Feb 61	10 Mar 61	2Q-FY62	In progress.
Puze, PD: M51A3	Premature	A-56-61 A-77-61 telecon	KM-2-933 KM-2-976 KM-2-966,987	Apr 61 23 May 61 15 Jun 61	14 Apr 61 24 May 61 15 Jun 61	1Q-FY62	In progress.
Puze, M500	Premature	A-31-61 A-43-61 A-61-61 telecon	CMR-2-86 JA-2-13 JA-1-187 KS-1-161	22 Feb 61 16 Mar 61 12 Apr 61 21 Jun 61	12 Apr 61 1 May 61 16 Jun 61 22 Jun 61	1Q-FY62	In progress.

* N/R - Not Reported

CA CATEGORY

Item	Malfunction	ML# Number	Lot Number	Date Occurred	Date Rec'd at FA	Estimated Completion Date	Remarks
Fuze, M84: M50A1	Detonated when dropped	A-159-60	UST-5-217	10 Nov 60	16 Nov 60	1Q-FY62	In progress.
Grenade, Band: Frag, M2	Premature	A-87-61	BII-13-34	Jun 61	8 Jun 61	3Q-FY62	
Grenade, Band, Frag: M21	Shattered body	A-151-60 A-184-60 A-20-61	LS-12-7 LS-15-121 LS-15-29	28 Jul 60 1 Dec 60 6 Feb 61	3 Nov 60 13 Feb 61 10 Feb 61	2Q-FY62	In progress.
Socket, 3.5 in: M21, M26A2	Premature	A-21-61 A-33-61	MA-4-25 COP-8-6A	9 Feb 61 1 Mar 61	10 Feb 61 2 Mar 61	1Q-FY62	In progress.
Signal, Illum, Cd: R, Cl, M52a1	Short range	A-76-60 A-153-60	CCG-11-13, 23, 24, 27, 29 USF-6-114	4 Jun 60 2 Oct 60	17 Jun 60 Jan 61	2Q-FY62	Awaiting additional samples.
Signal, Illum, AC: G-G, AN-M56A1	Short range	A-74-61	MOC-15-1	20 Oct 60	14 Jun 61	2Q-FY62	Awaiting samples.
Signal, Illum, AC: Short range R-Y, AN-M40A1	Short range	A-82-61	UPM-4-6A	5 Jun 61	22 Jun 61		Awaiting samples.
Signal, Illum, Cd: Premature White Star, Parachute, M127	Short range	A-78-61	LOW-3-13B	29 May 61	8 Jun 61	3Q-FY62	Awaiting samples.
Simulator, Projectile, Premature Air Burst: M74	Premature	A-163-60 A-170-60 A-81B-50 A-86-60	BII-2-54 NVM-1-36 NVM-1-19 BII-2-55	24 Oct 60 31 Oct 60 N/A 5 Jul 60	27 Dec 60 27 Dec 60 15 Jul 60 15 Aug 60	2Q-FY62	In progress.

* N/R - Not Reported

CA CATEGORY

Item	Calfunction	MIP Number	Lot Number	Date Occurred	Date Rec'd at PA	Estimated Completion Date	Remarks
Simulator, Proj, Premature Ground Burst: M1152i		A-81-61	PAC-42	27 May 61	8 Jun 61	3Q-FY62	Awaiting samples.
Simulator, Hand Grenade: M16	Misfire	A-38-61	PAC-64	23 Feb 61	13 Mar 61	2Q-FY62	Awaiting samples.

STATUS OF MALFUNCTION FILES

Item	Malfunction	MIF Number	Lot Number	CB CATEGORY		Date Rec'd at PA	Estimated Completion Date	Remarks
				Date Occurred	Date			
Ctg. 75MM: EE, M3A1	Short round	A-65-61	SUD-508-10	28 Apr 61	3 May 61	3Q-FY62	In progress.	
Ctg. 81MM: EE, M3A1	Short round	A-51-61	MA-4-244B	30 Mar 61	20 Apr 61	3Q-FY62	Awaiting samples.	
Ctg. 81MM: EE, M3A1	Dead, short round	A-50-61	MA-4-242A	5 Apr 61	27 Apr 61	3Q-FY62	Awaiting samples.	
Ctg. 81MM: EE, M3A1	Short round	A-33-60	MA-4-78A, 9-269A	8 Mar 60	11 Mar 60	2Q-FY62	In progress.	
Ctg. 81MM: EE, M3A1	Short round, misfires	A-150-60	ROP-9-189A	Not reported	27 Dec 60			
Ctg. 81MM: EE, M3A1	Short round	A-98-60	MA-4-226A	13 Jul 60	25 Jan 61			
Ctg. 81MM: EE, M3A1	Short round	A-13-61	MA-4-101	23 Jan 61	23 Feb 61	2Q-FY62	In progress.	
Ctg. 81MM: EE, M3A1	Short round	A-19-61	OA-1-271C	6 Feb 61	13 Mar 61			
Ctg. 81MM: EE, M56		A-18-61	MA-4-87B	31 Jan 61	9 Feb 61			
Ctg. 81MM: EE, M56A1		A-6-59	RVA-515-5A	26 Nov 58	4 Jan 60			
Ctg. 81MM: 8mm WP, M57A1		A-8-61	RVA-515-11	14 Dec 60	23 Feb 61			
		A-175A-60	RD-7-7	Nov 60	27 Dec 60			
		A-192-60	RD-7-37A	7 Dec 60	16 Jan 61			
Ctg. 4.2 in. EE, M3A1	Short round	A-36-58	IOP-3-3	12 Mar 58	Jul 59	2Q-FY62	In progress.	
Ctg. 4.2 in. 8mm WP, M2		A-66-60	IOP-3-18	18 May 60	14 Jul 60			
		A-14-60	RD-1-9	3 Feb 60	19 Mar 60			

CB CATEGORY

Item	Malfunction	MIF Number	Lot Number	Date Occurred	Date Rec'd at PA	Estimated Completion Date	Remarks
Ct4, 4.2 in: HB, N329	Short round	A-12-60	IOP-4-28	26 Jan 60	4 Feb 60	2Q-FY62	In progress.
		A-25-60	IOP-4-66	4 Feb 60	5 Mar 60		
		A-30-60	IOP-2-28	12 Mar 60	11 Apr 60		
Ct4, 4.2 in: HB, N329	Short round	A-17-61	LS-2-119	24 Jan 61	1 May 61	3Q-FY62	Awaiting samples.
Charge, Prop, 15900: M41	Range in-stability	A-55-61	IA-39102 MAD-60434	19 Apr 61	25 Apr 61	3Q-FY62	Awaiting samples.

TABLE V - STATUS OF XA FUNCTION FILES

Item	No. Function	YIF Number	Lot Number	NCA CATEGORY		Date Rec'd at FA	Estimated Completion Date	Remarks
				Date	Category			
Ctg. 40mm HE, SD, M42	Dud & split case	A-17-60	LS-12-31	26 Oct 60		2 Mar 60	22-FY62	Navy Investigation
Ctg. 90mm HE, M71	Misfire	A-44-61	NVA-5-39	11 Mar 61		21 Mar 61	32-FY62	Awaiting samples
Ctg. 106mm HEAT, M44A1	Abnormal propellant	A-40-60	ICP-2-11	23 Mar 60		8 Apr 60	22-FY62	In Progress
Ctg. 106mm HEAT, M44A1	Erratic rd	A-45-61	ICP-7-7	11 Jan 61		20 Apr 61	22-FY62	Awaiting samples
Ctg. 106mm HEAT, M44A1	Pulsed case	A-94-60	MA-6-3A	6 Jul 60		16 Sep 60	22-FY62	FA investigation
Ctg. 4.2 in: Illum, M335 v/Fuse, M337, M50A1	Parachute and ejection failure and fuse dud	A-58-61 A-37-61	MD-5-46 MD-5-19	17 Dec 60 14 Feb 61		8 May 61 15 May 61	32-FY62	Awaiting samples
Charge, Demo: 50 lb	Dud	A-29-61	DUP-1-77	15 Feb 61		28 Apr 61	12-FY62	In Progress
Charge, Prop. 8 inch: M1	Hangfire	A-16-61	IMD-30835-44	30 Jan 61		5 Apr 61	22-FY62	Awaiting samples

NCA CATEGORY (Continued)

Item	Malfunction	MIF Number	Lot Number	Date Occurred	Date Rec'd at PA	Estimated Completion Date	Remarks
Cutter, Par Actd: Misfires Rfg Ln, #2		A-53-59	OSI-22-13,14	21 May 59	12-FY60	2Q-FY62	In Progress
" " #2AL		A-96-59	OSI-2-8,9	21 May 59	28 Oct 59		
" " "		A-68-60	OSI-1-2,3	22-FY60	16 Jun 60		
Flare, Surf: Trip, Duds Parach, M92A1		A-76-61	PXC-10-24	18 May 61	Jun 61	3Q-FY62	In Progress
Puze, PD: M51A5	Duds	A-111-59 A-109-60 A-52-61 TT-5-1658	JA-6-19,49 MA-5-169 MA-1-235 FN-2-712	19 Nov 59 27 Jul 60 29 Mar 61 22 May 61	3 Dec 59 1 Nov 60 Apr 61 29 May 61	2Q-FY62	In Progress
Puze, MTS: M500	Duds	A-104-57 A-134-58 A-141-58 A-142-58 A-42-59 A-32-60 A-142-60	GMR-2-337 HAM-1-37 GMR-2-234A GMR-2-185A GMR-2-39 GMR-2-175 JA-1-32	23 May 57 8 May 58 9 Jul 58 Jul 58 25 Apr 59 19 Dec 59 Cet 60	12-FY60 12-FY60 12-FY60 12-FY60 Jan 60 19 Mar 60 15 May 61	2Q-FY62	In Progress Awaiting addtl samples " In Progress-FA " "
Puze, MTS: M501A1	Duds	A-57-56 Unassigned	EX-2-46 PA-7-15A	2 Oct 56 Aug 59	1Q-FY60 1Q-FY60	2Q-FY62	FA investigation Awaiting addtl samples " In Progress "
Puze, Fprox: M516B1	Duds	A-28-60 A-186-60 A-64-61	PD-5-478 RD-33-14X WOTC-1-32	5 Feb 60 5 Dec 60 20 Apr 61	25 Apr 60 16 Jan 61 15 May 61		
Puze, Fprox: M516B1	Duds	A-30-57 A-43-59 A-28-53	SAA-6094-C54 SAA-527-C54 SAA-533-C54	21 Mar 57 1958 15 Feb 58	Aug 60 Aug 60 Aug 60	2Q-FY62	DOFL investigation

MCA CATEGORY (Continued)

Item	Val/Function	WTF	Lot	Date Occurred	Date Rec'd at PA	Estimated Completion Date	Remarks
Grenade, Hand Frag, M26	Dats	A-65-59 A-76-61	12-14-1959 12-14-1959	12 Jun 59 2 Mar 61	22 FY60 10 Mar 61	22-FY62	In Progress
Rocket Motor, 5 inch; M2 10 Mod 6	Motor failure	A-174-60 A-5-61	RTDA 270-S52 RUMAR-1334-S55	Nov 60 N/A	Jan 61 13 Feb 61	3Q-FY62	Navy investigation
Signal, Ill, AC: J-Y, AN-M42-2	Star failure	A-1-61 APG Rept	APW-52-1 KHM-1-1	10 Jan 61 Jan 60	2 Feb 61 Apr 60	2Q-FY62	In Progress
Signal, Ill, AC: P-Y, AN-M42-2	Short rd	TT-1-0396	KCM-1-1	Dec 59	21 Jan 60	2Q-FY62	In Progress
Signal, Ill, AC: Q-O, AN-M42-2	Ignition failure	A-48-61	APW-50-1	5 Apr 61	24 Apr 61	3Q-FY62	Awaiting samples
Signal, Ill, AC: R-3, AN-M42-2		A-47-61	APW-51-1	29 Mar 61	17 Apr 61		
Signal, Sub, Od: Red, M62	Pressure	A-111-60	CCG-1-24	8 Aug 60	12 Oct 60	2Q-FY62	In Progress
Simulator, Projl, Gd: M115E1	Deds	A-58-60	PIC-1-35	12 Apr 60	10 May 60	2Q-FY62	In Progress
Simulator, Projl, Od: M155E2	Misfires	A-72-61	PIC-2-14	May 61	15 May 61	2Q-FY62	In Progress

M/3 - Not Reported

STATUS OF MALFUNCTION FILES

Item	Malfunction	WFF Number	Lot Number	MCA CATEGORY		Date Rec'd at FA	Estimated Completion Date	Remarks
				Date Occurred	Date			
Ctg. Com: AP-1, Split Ctg Case		A-66-60 A-73-60	ICF-5-22X, 15-21X ICF-13-23X	9 May 60 24 May 60		22 Aug 60 Aug 60	30FY62	FA investigation
Ctg. Com: HEAT, Split Ctg Case		A-152-60	A-2-13	16 Sep 60		9 Dec 60	30FY62	FA investigation
Ctg. Com: HEAT, Split Ctg Case		A-114-60	ICF-7-2	11 Aug 60		16 Nov 60	30FY62	FA investigation
Proj. and Prop. Fail to Ctg. 120mm: Tk chamber		A-25-61	RVA-10-2	1 Feb 61		8 Mar 61	20FY62	Awaiting samples

SECTION VI - DEFICIENCY INVESTIGATIONS

1. General

Deficiency investigations are conducted to determine the cause of deterioration in ammunition. An investigation is started when an unusual condition is observed in the field or on the basis of the review of surveillance reports.

Table I shows the grouping of deficiency investigations by item, in alphabetical order. Table II is a listing of completed or terminated deficiency investigations.

2. Deficiency Investigations Completed 4Q-FY61:

a. Cartridge, 90mm, HEAT-T, T30C356, w/Fuze, PIBD, M509E6 Premature

Investigation of the low-order in-bore premature indicated that the deficiency was not attributable to the fuze. The probable cause of the premature was the design of the spike-to-body joint. It was determined that existing T300 stocks are subject to this type of premature. However, it was considered that the safety of the tank crew would not be jeopardized in firing these stocks, provided firing over heads of personnel was prohibited in accordance with AR-385-63. It was recommended that existing T300 stocks be used for training as required, providing training considerations overrode those of troop confidence. Action was taken to provide a new spike-to-body joint design and a desensitized nose element in future production.

b. Flare, Surface, Trip, M49, Lot MZP-1-53:

The deficiencies noted were failure to ignite, slow ignition and short burning times to the extent of half the samples tested. It was recommended that all the remaining items in this lot should be destroyed on the basis that there is no economical way to renovate the item.

c. Mine, AP, M2A1, w/Fuze, M6A1(Lots SRD-600-3 and SRD-600-10):

Investigation revealed that these lots are unserviceable and that the item will be replaced by the M16A1 Mine. It was recommended that the above lots be destroyed.

3. Significant Deficiency Investigations Active at End of Quarter:

a. Simulator, Booby Trap, M117, M118 and M119

Ordnance Ammunition Command forwarded a copy of a test report to this Arsenal that had been prepared by Seneca Ordnance Depot. The test was designed to attempt to compare various methods of actuating the simulator, using the method of installation that had been recommended by

this Arsenal. The test utilized both the spring presently packed with the simulators and a heavier one that had been developed and tested at this Arsenal. Seneca's report also included a description of the functioning characteristics of the item when two different refinements were added to the basic method of installation. The first refinement consisted of substituting a spool, from which the trip wire had been removed, for the staple where the trip wire makes a 180° turn. The other refinement was to mount a second spool on the nail where the trip wire makes a 90° turn.

Seneca's report recommended that the spring presently packed with the simulators be used, and two spools be used where the trip wire makes 180° and 90° turns.

This Arsenal considered that Seneca's recommendation was a very desirable solution to improve the functioning of the simulator. However, previous tests by this Arsenal indicated that virtually 100% of the friction would have to be eliminated from the system before the original spring could give reliable performance with a Grade III lot. Since data was not taken during their test, Ordnance Ammunition Command arranged for a representative from Picatinny Arsenal to visit Seneca Ordnance Depot to witness tests and verify the improvement by using two spools with the original spring, as they recommended.

No record was available that could indicate which lot of simulators was used in the test that had been conducted at the Depot. It was agreed that Lot LCW-2-11 of Simulator, Booby Trap, M18 would be used for the retest. This lot had been assigned Grade III as a result of a surveillance test on 16 March 1960. There had been nine (9) major function defects (tension required to withdraw pullecord greater than tension to extend spring three times length) out of a total of fifty (50) samples tested. (Aberdeen later upgraded this lot to Grade II). A summary of the test results is as follows:

Test 1 - with original springs and without spools. Six items out of 20 functioned.

Test 2 - with original springs and one spool to replace the upper staple. Eight items out of 20 functioned.

Test 3 - with original spring and with two spools to replace the upper staple and the lower nail, as recommended by Seneca. Twelve items out of 20 functioned. One failure was due to match composition failure.

Test 4 - with heavy springs and without spools, as recommended by this Arsenal. Thirty-seven items out of 40 functioned.

Test 5 - with heavy springs and with one spool. Thirty-eight items out of 40 functioned.

Test 6 - with heavy springs and with two spools. All 40 items functioned.

In view of the above, and the previous work done at this Arsenal, it is evident that any renovation of the defective lots of simulators must require replacement of the current springs with heavier ones. Slight additional improvement in performance is obtained by using one spool, and further improvement can be obtained by using two spools. However, to use two spools as a basis of renovation would involve extensive repacking.

It was recommended that the spring that is presently packed with simulators in defective lots be replaced by the heavier spring, and either one or two spools be used in the installation of the booby trap. It was further recommended that Ordnance Ammunition Command be requested to have representatives visit Picatinny Arsenal to discuss the optimum renovation procedure.

b. PD Fuze. M51A5

(1) During the quarter investigation of fuzes from lots which had experienced prematures and duds was continued with regard to the basic fuze as part of the current overall program for improving the M51A5 Fuze.

(2) To minimize the possibility of recurring prematures, it was recommended that action be taken to rebooster complete rounds and bulk fuzes with M125A1 Boosters. The delay arming feature of the M125A1 Booster (minimum delay arming distance of 220 feet) will provide safe ammunition and preclude close-in prematures resulting in casualties possible with current fuze.

(3) Investigation of the dud problem with the M51A5 Fuzes indicates that the M2 Delay Element used in the M1 Delay Plunger assembled in the fuze is at fault. An improved delay element is currently undergoing development at this Arsenal as a replacement for the M2 Delay Element. Tests will be conducted at the completion of the development program to assure that improved performance is obtained in lots currently under suspension for erratic delay times and duds.

U.S. ARMY COMMISSION ON INVESTIGATIONS

Item	Number	Efficiency	Date Initiated	Estimated Compl Date	Remarks
Ctg. 75mm. M70 AL.	CA 2-7	Duds	1/61	3Q-FY62	Awaiting Samples
w/Fuze. M501	RD 31-4CX	Fuze duds and ignition failures	12/60	3Q-FY62	Awaiting Samples
Ctg. 105mm. Ill. M31-1	RD 33-737	Various	10/60	2Q-FY62	Investigation in Progress
w/Fuze M501	Various	Various	10/60	2Q-FY62	"
Ctg. 155mm. Smoke, MC.	Various	Parachute Assy & Fuze Failures	6/61	2Q-FY62	Awaiting Samples
Proj. 155mm. Ill. M32A231	RD 5-44	Failure to ignite	5/61	2Q-FY62	Investigation in Progress
Ctg. 4.2" Ill. M335	MZP-1-10	Smoke Failures	6/61	3Q-FY62	Awaiting Samples
Grenade, Rifle. Smoke.	CA 10-27	Star Failures	10/60	2Q-FY62	Investigation in Progress
Green Streaker M23A1	UNC 3-34	Short round	4/61	4Q-FY62	Awaiting Samples
Signal, Ill. AC: Dbl	APW-61-1	Short burning time	10/60	2Q-FY62	Investigation in Progress
Star: AH M58	FCX-1-2	Short rounds	5/61	3Q-FY62	"
AN-M58A2	APW-13-7	Short rounds	3/61	3Q-FY62	"
AN-M58A2	APW-10-11	Illuminant failures & loose firing caps	8/60	2Q-FY62	"
Signal, Ill. AC: Single	API-3-2A	Excessive protective coating	1/61	2Q-FY62	"
Star, AP-M3A1	MWC-13-44	Pullicord defects and rust	2/61	3Q-FY62	Awaiting Samples
Signal, Ill. Gnd. Parachute, M127	BPO-1-28A	Various Duds	2/61	3Q-FY62	"
Simulator, Hand Grenade, M116	MWC-22-5,7		5/61	3Q-FY62	"

TABLE II - COMPLETED DEFICIENCY INVESTIGATIONS

Item	Lot Number	Deficiency	Date Completed	Disposition
CIG. 1000, 1001, 1002, 1003	ICP CR 20, 60	Premature in tube	6/61	Release
Flare, Surface, Trip: 1009	FZP 1-95	Various	5/61	Demilitarize
Vine, AF, 1241, w/Pipe 1041	SED 000-3, 10	Duds	5/61	Demilitarize
CIG. 1005, 1006, 1007	Various	Split Ignition Cartridge		Split Cigs were replaced and destroyed
Fuzo, PD 1045	Various	Various		Grouped with malfunction investigation (See Section V)

SECTION VII - MAINTENANCE EVALUATION STUDIES

1. Nike Missile System

a. Explosive Harness Assemblies XM38 and XM39 - Safety and Handling Program

During this quarter a test plan was initiated to determine if RDX loaded detonating cord would show a decrease in sensitivity over the PETN loaded (M24) detonating cord. The following drop tests will be made using RDX loaded detonating cord:

Drop Weight Configuration	Height	No. of Drops
Small Ball	5 ft	20
" "	3 ft	20
" "	1 ft	40
1/16 wedge	4 ft	20
" "	3 ft	20
" "	2 ft	10

The number of detonations will be recorded and the results compared with those obtained from the PETN (M24) detonating cord. If a decrease in sensitivity is observed a program of design and feasibility will be undertaken to provide an explosive harness assembly of RDX explosive train.

2. Improved Honest John System

a. Igniter Assembly: XM58

A detailed plan for a Shelf and Service Life Program for the Igniter Assembly: XM58 has been completed and presently is being forwarded to the Army Ballistic Missile Agency.

b. Thermal Battery

A plan for a Shelf and Service Life Program for the Thermal Battery used within the XM3 Pedestal is being finalized prior to delivery to Army Ballistic Missile Agency. It is expected that this plan will be forwarded during the next month.

c. Safety and Arming Device: XM43

Shelf and Service Life Program for this item is presently being conducted at this Arsenal. Initial inspection will be conducted during the next quarter to determine environmental effects after nine months of storage.

d. Power Pack Y155

Program on Shelf and Service Life continues on this item. Voltage recovery tests will be conducted during this quarter.

3. Littlejohn Rocket System

a. Igniter Assembly XM57

Plan for a Shelf and Service Life Program for the XM57 Igniter Assembly has been completed and forwarded to the Army Ballistic Missile Agency during the past quarter.

b. Battery and Switch Assembly

Shelf and Service Life Program for the Battery and Switch Assembly has been developed and is presently being finalized. It is expected that the proposed program will be forwarded to Army Ballistic Missile Agency during the first month of the next quarter.

4. Light Antitank Weapon (LAW)

A rough draft of the detailed shelf life plan has been completed during this quarter. Five hundred (500) samples are expected during the next quarter.

5. 115 MM Direct Support Artillery System XM70

Preliminary plans for maintenance evaluation program for the motor of Rocket XM70 are in preparation. These plans are expected to be completed during next quarter. Procurement action for 300 motors for the maintenance evaluation program will be initiated in conjunction with the next R&D procurement.

SECTION VIII - MAINTENANCE ENGINEERING ACTIVITIES RELATED TO SURVEILLANCE

1. General

This section disseminates information pertaining to the maintenance engineering activities performed by Picatinny Arsenal based on the analysis of monthly surveillance reports, preparation of OSM's, etc.

2. Monthly Surveillance Reports

During this quarter, approximately 240 surveillance grades on 41 different items reported in the Monthly Surveillance Reports were reviewed. This consisted of reviewing all grades and of determining the appropriate action necessary for those items Graded III or D. Action generally consisted of one or more of the following:

- a. Revision of technical criteria for OSM.
- b. Revision of drawings.
- c. Recommendations as to eliminating process deficiencies.
- d. Recommendations as to improved packing, handling, and storage procedures.
- e. Recommendations as to disposition.

3. Corrective Action Evaluation on Grade III and D Items

This Arsenal is presently conducting 18 deficiency investigations on 10 items. Refer to Section VI of this report for detailed list.

4. Technical Criteria for OSM's

Technical criteria is being prepared for the following items:

- a. Cartridge, HS-T, M71A1 for 90-MM Guns.
- b. Cartridge, Smoke, WP-T, M313A1 for 90-MM Guns.
- c. Cartridge, Smoke, WP, M370 for 81-MM Mortars.
- d. Cartridge, HS, M309A1 for 75-MM Rifles.

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4th QUARTER FY61

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